EFFICIENCY EVALUATION OF ISLAMIC BANKING IN THE DUAL BANKING SYSTEM: AN ANALYSIS OF COMMERCIAL BANKS IN MALAYSIA

A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN FULL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY, UNIVERSITI UTARA MALAYSIA

By

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ABSTRAK

Kajian kami memberi perspektif baru terhadap penilaian ke atas prestasi operasi Perbankan Islam. Buat pertama kali, kajian ini menilai tahap kecekapan kos dan untung bagi bank-bank Islam penuh dan operasi Skim Perbankan Islam bank tempatan dan bank asing di Malaysia bagi tempoh 1998-2004. Penggunaan teknik Data Envelopment Analysis (DEA) membolehkan kami mengaplikasikan pelbagai pengukur kecekapan yang memberi keterangan berhubung perbezaan kecekapan kos dan untung di kalangan bank-bank dari pelbagai aspek. Di samping itu, teknik ini mengkaji punca pertumbuhan produktiviti dan perubahan dalam tahap kecekapan bank. Penggunaan kaedah Generalized Least Square (GLS) pula mengkaji samada aspek-aspek berkaitan bank seperti faktor-faktor risiko dan kualiti aset serta variabel baru iaitu tanggungjawab sosial korporat mempunyai hubungkait dengan tahap kecekapan bank. Kami juga mengkaji hubungkait antara tanggungjawab sosial korporat dan keuntungan yang diperolehi bank.

Berikut adalah dapatan-dapatan penting daripada kajian ini. Bank adalah cekap dari segi pengawalan kos berbanding kegiatan memaksimakan untung. Penyumbang utama bagi kecekapan kos di kalangan bank tempatan adalah dari segi peningkatan dalam amalan pengurusan sumber, dan bank asing pula dari segi ekonomi bidangan. Sebaliknya, penyumbang utama bagi kecekapan untung untuk bank tempatan dan asing adalah peningkatan dalam amalan pengurusan sumber. Peningkatan dalam produktiviti banyak bergantung pada kemajuan teknologi untuk model kos, dan peningkatan dalam kecekapan teknikal untuk model untung. Namun begitu, kemajuan teknologi tidak banyak memberi kesan dalam meningkatkan kecekapan kos bank. Analisis kecekapan dan produktiviti bank mendapati purata kecekapan kos dan untung bagi operasi perbankan Islam Malaysia adalah jauh dari tahap memuaskan, iaitu kurang dari kecekapan sepenuh.

Berbanding dengan dapatan daripada model untung, peningkatan dalam kecekapan teknikal telah meningkatkan tahap kecekapan untung bank. Bagi kedua-dua model kos dan untung, perubahan dalam kecekapan skala membuktikan bahawa faktor saiz mempunyai kepentingan tinggi dalam hubungkaitnya dengan kecekapan dari segi ekonomi bidangan. Analisis regresi mengenalpasti faktor-faktor seperti saiz operasi, kuasa pasaran, keuntungan dan tahap modal sebagai ciri-ciri bank yang cekap. Seperti jangkaan, tanggungjawab sosial korporat memiliki kepentingan tinggi dan positif dalam hubungkait dengan keuntungan bank. Secara keseluruhannya, keputusan daripada analisis banyak memihak kepada teori struktur efisien. Ini bermakna bank yang cekap mendapat untung yang berlebihan.

ABSTRACT

This study presents new perspectives on performance evaluation of Islamic banking operations by investigating for the first time, both cost and profit efficiency of full-fledged Islamic banks and the Islamic window operations of domestic and foreign banks in Malaysia. The test period is from 1998 to 2004. The application of Data Envelopment Analysis (DEA) technique has provided several efficiency measures such as allocative, pure technical and scale efficiency that explain cost and profit efficiency differentials among banks, as well as the sources of productivity growth and efficiency change of these banks. In addition, the Generalized Least Square (GLS) multiple regressions explain the differences in the calculated efficiency measures. We also investigate the relation between risk, asset quality factors and a new variable called corporate social responsibility (CSR), and the bank's degree of efficiency. Finally, we test the impact of CSR on bank profitability.

The following are the main findings. Profit efficiency levels of banks are lower than cost efficiency levels. This implies that banks are better at controlling costs than maximizing profit. The main contributor for cost efficiency of domestic and foreign banks comes from improved resource management practices and improved economies of scales respectively. In contrast, both domestic and foreign banks record improved resource management practices as the highest profit efficiency contributor. The results of productivity show that increases in productivity are mainly due to technological advancement for the cost model and increases in technical efficiency for the profit model. Despite technological advancement for the cost model, there is little improvement in cost efficiency of banks. The efficiency and productivity analyses indicate that the average cost and profit efficiency of Islamic banks in Malaysia over the test period is far from satisfactory, that is, there is lack of full efficiency.

Unlike the results in the profit model, the increase in technical efficiency has improved the profit efficiency levels of banks. For both cost and profit models, the scale efficiency change results indicate that size is significantly related to efficiency in terms of economies of scale. The regression results identify size of operation, market power, profitability, and capitalization level to be characteristics of efficient banks in the sample. Finally, as expected CSR is positively and significantly related to profitability of banks. Overall the results from this study support the efficient structure theory which suggests that increased profit is derived from firm-specific efficiency.

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LIST OF ABBREVIATIONS

AE	Allocative Efficiency
AM Bank	Arab Malaysian Bank
ASEAN	Association of Southeast Asian Nation
ATM	Automated Teller Machine
BAFIA	Banking and Financial Institutions Act
BHC	Bank Holding Company
BIMB	Bank Islam Malaysia Berhad
BMMB	Bank Muamalat Malaysia Berhad
BNM	Bank Negara Malaysia
CCR	Charnes, Cooper and Rhodes
CE	Cost Efficiency
CRS	Constant Returns to Scale
CSR	Corporate Social Responsibility
CRDC	Corporate Debt Restructuring Committee
DEA	Data Envelopment Analysis (Technique)
DFA	Distribution Free Approach
DMU	Decision Making Unit
DRS	Decreasing Returns to Scale
EON	Edaran Otomobil Nasional
FDH	Free Disposal Hull (Technique)
FF	Fourier Flexible Functional Form
FSMP	Financial Sector Master Plan
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GIC	Government Investment Certificate

LIST OF ABBREVIATIONS (continued)

GII	Government Investment Issue
HSBC	Hong Kong Shanghai Banking Corporation
IBA	Islamic Banking Act
IBD	Islamic Banking Division
IBFIM	Islamic Banking and Finance Institute Malaysia
IBS	Islamic Banking Scheme
IIMM	Islamic Inter-Bank Money Market
IFSB	Islamic Financial Services Board
IOFC	International Offshore Financial Center
IPDS	Islamic Private Debt Securities
IRS	Increasing Returns to Scale
IS	Islamic Subsidiary
KLCI SI	Kuala Lumpur Composite Index Syariah Index
IT	Information Technology
LP	Linear Program
Maybank	Malayan Banking Berhad
MGIC	Malaysian Government Investment Certificate
MII	*Mudarabah* Inter-Bank Investment
M&A	Merger and Acquisition
MRS	Marginal Rate of Substitution
MRT	Marginal Rate of Transformation
NIRS	Non-Increasing returns to Scale
NDRS	Non-Decreasing Returns to Scale
NPL	Non-Performing Loan
NSAC	National Syariah Advisory Council

LIST OF ABBREVIATIONS (continued)

NDRS	Non-Decreasing Returns to Scale
NPL	Non-Performing Loan
NSAC	National Syariah Advisory Council
OCBC	Overseas Chinese Banking Corporation
PC Banking	Personal Computer Banking
PDS	Private Debt Securities
PE	Profit Efficiency
PER	Profit Equalization Reserve
PLS	Profit Loss Sharing
PTE	Pure Technical Efficiency
RTS	Returns to Scale
RE	Relative Efficiency Hypothesis
RHB	Rashid Hussin Bank
RMP	Relative Market Power Hypothesis
ROA	Return on Assets
SCP	Structure-Conduct-Performance
SE	Scale Efficiency
SFA	Stochastic Frontier Analysis (Technique)
SME	Small and Medium Scale Enterprise
TE	Technical Efficiency
TFA	Thick Frontier Approach (Technique)
TL	Translog Functional Form
US	United States (of America)
VRS	Variable Returns to Scale
WTO	World Trade Organization
TFP	Total Factor Productivity

TC	Technological Change
TEC	Technical Efficiency Change
PEC	Pure Technical Efficiency Change
SEC	Scale Efficiency Change

CHAPTER ONE

BACKGROUND TO THE RESEARCH PROBLEM

INTRODUCTION

ncept of production efficiency originated from Cobb and Douglas' (1928) study to the structural relation between inputs and outputs in economic production. For ple, efficient production occurs when a given level of output is produced with minimum sage. If actual input is more than the output, then the firm's production is inefficient the firm is said to be operating in the region of *decreasing returns to scale*. On the other the value of outputs is greater than the value of the inputs, then the production of the occurring in the area of *increasing returns to scale*. *Constant returns to scale* means the output value equals input value. Under the theory of production frontier – which is the plane of the changes in production from one period to the next - efficiency levels time indicate how closely a firm operates to the possible production frontier. However, obb-Douglas measures do not indicate whether the production frontier has shifted or not. words, it does not measure productivity growth. Subsequently, Malmquist (1953) a time component to the production function to measure productivity change or growth *ime*.

ording to Coelli *et al.* (2003), a natural measure of a production unit's performance is the productivity ratio which is the ratio of output changes to input changes as was done in Malmquist's paper. A higher ratio is associated with better performance in terms of better iency, that is, the increasing returns scenario. Meanwhile, according to the efficient ure model that can be applied to banking, higher profits are a result of lower costs d from greater production efficiency in using fewer inputs for greater outputs (Demsetz,

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APPENDIX 4: Summary of Bank Productive Efficiency Studies (continued)

Review of X-efficiency studies in other banking systems

Author	Year	Data	Model	Findings
Hao; Hunter, and Yang	1999	Data on 19 Korean private banks observer over the period 1985 to 1995	SFA	Efficiency ranges form 85% to 91%.
Srivastava	1999	85 Indian commercial and public banks studied over the period 1994-1995	SFA	The mean cost efficiencies of private and public banks are 89.18 and 98.11 per cent respectively. The mean efficiency of recent entrants reports higher level than current banks. Moreover, highest cost efficiency is, generally, reported for middle-sized banks, followed by small and large sized banks.
Altunbas, Liu, Molyneux, and Seth	2000	Data on Japanese banks (130 banks in 1993 and 1994, and 121 in 1995)	Fourier Flexible and SFA	Inefficiencies in two models are about similar and range between 5% and 7%.
Intarachote	2000	Sample on 15 Thai banks, 14 foreign banks and other finance and specialised institutions	DEA	Mean inefficiency ranges from 26% to 48% for national banks, 33% to 50% for the foreign banks, and 6% to 14% for the finance and specialised institutions.
Katib and Matthews	2000	Data on commercial banks in Malaysia over the period 1989-1994	DEA	Technical efficiency ranged between 68 and 80%.
Jackson and Fethi	2000	Data on Turkish commercial banks for the year 1998	DEA	Overall technical efficiency is 68%.
Sathye	2001	Data for Australian banks for the year 1996	DEA	Overall cost (X-efficiency) is 58%.

APPENDIX 4: Summary of Bank Productive Efficiency Studies (continued)

Review of X-efficiency studies in other banking systems	Author	Year	Data	Model	Findings
	Isik and Hassan	2002	Data consist of 39 banks from 1988, 54 banks from 1992 and 56 banks from 1996 of Turkish banks over the 1988-1996 period	DEA and parametric approach	Overall cost and profit efficiencies for the Turkish banks are 72 and 83 per cent respectively.
	Al-Jarrah	2002	Data on 82 banks operating in Jordan, Egypt, Saudi Arabia, and Bahrain over the period 1992-2000	Fourier Flexible and SFA	Cost efficiencies are found to be 95 per cent, standard profit 66 per cent, and alternative profit efficiencies 58 per cent. Islamic banks found to be the most cost and profit efficient banks. Geographically, Bahrain banks are the most efficient, while Jordanian banks are found to be the least efficient.
	Batchelor and Wadud	2003	Data consist of 13 commercial banks with Islamic window operations	DEA	Overall cost efficiency ranged between 63 and 84%.
	Yudistira	2004	Data on 18 Islamic banks from Middle East and non-ME countries over the period 1997-2000	DEA	Overall inefficiency is 10%.
	Amir	2004	Data on Bank Islam over the period 1984-2005	SFA	Overall inefficiency is 48%, with more allocative inefficiency (31%) than technical inefficiency (25%).

APPENDIX 4: Summary of Bank Productive Efficiency Studies (continued)

	Author	Year	Data	Model	Findings
Review of X-efficiency studies in other banking systems	Wadud and Yasmeen	2004	Data on 9 private commercial banks (conventional and Islamic banks) in Bangladesh in 2001	DEA	A majority of private banks achieved full PTE, but operated with a considerably large proportion of scale inefficiency. Inappropriate scale of operation has been a major factor contributing to the lower overall TE for many of the private banks.
	Sturms and Williams	2004	Data for Australian banks over the period 1988-2001	DEA and SFA	Overall technical efficiency ranged between 73 and 94%.

Notes: SFA is the Stochastic Frontier Approach; DEA is the Data Envelopment Approach; DFA is the Distribution Free Approach; TFA is the Thick Frontier Approach; and FCA is the Functional Cost Analysis.

Sources: Berger and Humphrey (1997), Intarachote (2000), Casu (2000), Girardone (2000), Al-Jarrah (2002), and author's own updates.

APPENDIX 5

Cost Efficiency of Individual Banks of Malaysian Islamic Banking Operations (1998-2004)

Year	Bank	Assets (RM '000)	CE	AE	TE
1998	Affin	1,588,309	0.904	0.904	1.000
	AmBank	412,210	1.000	1.000	1.000
	EON	391,282	1.000	1.000	1.000
	Hong Leong	46,489	0.606	0.606	1.000
	Maybank	1,662,385	0.509	0.509	1.000
	OCBC	56,013	0.553	0.790	0.700
	Public	370,356	0.455	0.455	1.000
	Southern	117,090	0.679	0.679	1.000
	Std. Ch.	59,458	0.586	0.586	1.000
	BIMB	4,904,385	1.000	1.000	1.000
	RHB	361,489	0.526	0.526	1.000
	Alliance	59,637	0.746	0.746	1.000
	MEAN	830,794	0.714	0.733	0.975
1999	Affin	1,950,588	0.809	0.809	1.000
	AmBank	889,022	1.000	1.000	1.000
	EON	321,708	1.000	1.000	1.000
	Hong Leong	589,258	0.599	0.599	1.000
	Maybank	3,743,753	0.762	0.762	1.000
	OCBC	328,712	0.517	0.576	0.897
	Public	1,396,720	0.258	0.390	0.662
	Southern	380,116	0.681	0.681	1.000
	Std. Ch.	101,020	0.741	0.741	1.000
	BIMB	6,760,386	1.000	1.000	1.000
	RHB	1,990,789	0.439	0.439	1.000
	Alliance	213,048	0.787	0.787	1.000
	MEAN	1,373,433	0.716	0.732	0.963
2000	Affin	2,281,134	0.520	0.520	1.000
	AmBank	1,507,030	1.000	1.000	1.000
	EON	546,950	1.000	1.000	1.000
	Hong Leong	374,336	0.628	0.628	1.000
	Maybank	3,593,516	0.502	0.502	1.000

	OCBC	490,003	0.420	0.457	0.921
	Public	1,386,742	0.285	0.285	1.000
	Southern	475,439	0.430	0.430	1.000
	Std. Ch.	86,430	0.858	0.858	1.000
	BIMB	8,492,306	1.000	1.000	1.000
	RHB	2,575,990	0.292	0.340	0.859
	BMMB	5,121,428	0.878	0.960	0.915
	HSBC	57,772	0.241	0.241	1.000
	MEAN	1,481,511	0.620	0.632	0.977
	Affin	3,143,792	0.735	0.735	1.000
	AmBank	1,197,277	1.000	1.000	1.000
	EON	880,451	0.620	0.640	0.969
	Hong Leong	858,557	0.544	0.544	1.000
	Maybank	7,767,329	0.571	0.571	1.000
	OCBC	1,307,448	1.000	1.000	1.000
	Public	1,895,076	0.511	0.511	1.000
2001	Southern	811,913	0.490	0.495	0.990
	Std. Ch.	140,156	0.855	0.855	1.000
	BIMB	10,335,296	1.000	1.000	1.000
	RHB	3,729,530	0.477	0.546	0.872
	Alliance	386,465	0.707	0.800	0.884
	BMMB	5,438,666	1.000	1.000	1.000
	HSBC	150,136	0.271	0.271	1.000
	MEAN	2,024,095	0.699	0.712	0.980
2002	Affin	4,192,584	0.575	0.575	1.000
	AmBank	1,097,036	1.000	1.000	1.000
	EON	1,570,116	0.756	0.756	1.000
	Hong Leong	1,275,086	0.643	0.643	1.000
	Maybank	10,103,090	0.631	0.631	1.000
	OCBC	1,097,894	0.658	0.714	0.921
	Public	2,622,088	0.645	0.645	1.000
	Southern	764,101	0.424	0.424	1.000
	Std. Ch.	93,056	1.000	1.000	1.000
	BIMB	12,130,915	1.000	1.000	1.000
	RHB	4,288,217	0.562	0.562	1.000
	Alliance	723,479	0.569	0.600	0.949

	BMMB	6,561,482	1.000	1.000	1.000
	HSBC	243,985	0.311	0.311	1.000
	MEAN	3,340,224	0.698	0.704	0.991
	Affin	3,509,064	0.580	0.580	1.000
	AmBank	983,126	1.000	1.000	1.000
	EON	1,621,067	0.784	0.810	0.967
	Hong Leong	1,370,676	0.495	0.495	1.000
	Maybank	12,416,465	1.000	1.000	1.000
	OCBC	1,643,753	0.492	0.535	0.921
	Public	3,334,017	0.626	0.626	1.000
2003	Southern	852,280	0.391	0.747	0.524
	Std. Ch.	190,415	0.658	0.658	1.000
	BIMB	13,717,155	1.000	1.000	1.000
	RHB	5,997,330	0.588	0.588	1.000
	Alliance	966,868	0.462	0.556	0.831
	BMMB	7,315,942	1.000	1.000	1.000
	HSBC	1,854,076	0.998	0.998	1.000
	MEAN	3,983,731	0.720	0.757	0.946
	Affin	3,250,297	0.694	0.694	1.000
	AmBank	1,329,375	1.000	1.000	1.000
	EON	3,935,118	0.633	0.633	1.000
	Hong Leong	1,396,770	0.550	0.550	1.000
	Maybank	17,056,547	1.000	1.000	1.000
	OCBC	1,576,225	0.553	0.553	1.000
	Public	8,208,597	0.338	0.409	0.825
2004	Southern	1,048,782	0.462	0.568	0.814
	Std. Ch.	1,080,410	0.545	0.545	1.000
	BIMB	12,958,514	1.000	1.000	1.000
	RHB	6,213,078	0.589	0.605	0.973
	Alliance	1,231,948	0.481	0.581	0.829
	BMMB	8,061,414	1.000	1.000	1.000
	HSBC	3,209,061	0.905	0.905	1.000
	MEAN	5,039,724	0.696	0.717	0.960

APPENDIX 6

Profit Efficiency of Individual Banks of Malaysian Islamic Banking Operations (1998-2004)

Year	Bank	Assets (RM '000)	PE	AE	TE
1998	Affin	1,588,309	0.344	0.784	0.439
	AmBank	412,210	1.000	1.000	1.000
	EON	391,282	0.809	0.962	0.841
	Hong Leong	46,489	0.568	0.568	1.000
	Maybank	1,662,385	1.000	1.000	1.000
	OCBC	56,013	0.543	0.862	0.630
	Public	370,356	0.149	0.149	1.000
	Southern	117,090	0.659	0.664	0.993
	Std. Ch.	59,458	0.579	0.768	0.753
	BIMB	4,904,385	0.156	0.206	0.759
	RHB	361,489	0.293	0.322	0.910
	Alliance	59,637	0.744	0.744	1.000
	MEAN	830,794	0.570	0.669	0.860
1999	Affin	1,950,588	1.000	1.000	1.000
	AmBank	889,022	1.000	1.000	1.000
	EON	321,708	1.000	1.000	1.000
	Hong Leong	589,258	0.502	0.735	0.682
	Maybank	3,743,753	1.000	1.000	1.000
	OCBC	328,712	0.513	0.978	0.525
	Public	1,396,720	0.305	0.466	0.656
	Southern	380,116	0.681	0.734	0.928
	Std. Ch.	101,020	0.826	0.826	1.000
	BIMB	6,760,386	0.898	0.898	1.000
	RHB	1,990,789	0.296	0.686	0.431
	Alliance	213,048	0.880	0.880	1.000
	MEAN	1,373,433	0.742	0.850	0.852
2000	Affin	2,281,134	0.445	0.657	0.678
	AmBank	1,507,030	0.920	0.920	1.000
	EON	546,950	1.000	1.000	1.000
	Hong Leong	374,336	0.639	0.639	1.000
	Maybank	3,593,516	1.000	1.000	1.000

	OCBC	490,003	0.586	0.711	0.824
	Public	1,386,742	0.445	0.445	1.000
	Southern	475,439	0.356	0.855	0.417
	Std. Ch.	86,430	0.858	0.858	1.000
	BIMB	8,492,306	1.000	1.000	1.000
	RHB	2,575,990	0.428	0.626	0.683
	BMMB	5,121,428	0.278	0.553	0.503
	HSBC	57,772	0.242	0.242	1.000
	MEAN	1,481,511	0.631	0.731	0.854
2001	Affin	3,143,792	0.246	0.363	0.677
	AmBank	1,197,277	1.000	1.000	1.000
	EON	880,451	0.580	0.936	0.619
	Hong Leong	858,557	0.427	0.427	1.000
	Maybank	7,767,329	1.000	1.000	1.000
	OCBC	1,307,448	0.401	0.476	0.844
	Public	1,895,076	0.425	0.425	1.000
	Southern	811,913	0.402	0.795	0.506
	Std. Ch.	140,156	0.855	0.855	1.000
	BIMB	10,335,296	0.716	0.716	1.000
	RHB	3,729,530	0.171	0.477	0.358
	Alliance	386,465	0.890	0.890	1.000
	BMMB	5,438,666	0.221	0.551	0.400
	HSBC	150,136	0.269	0.269	1.000
	MEAN	2,024,095	0.543	0.656	1.000
2002	Affin	4,192,584	0.286	0.286	1.000
	AmBank	1,097,036	1.000	1.000	1.000
	EON	1,570,116	0.473	0.930	0.509
	Hong Leong	1,275,086	0.396	0.396	1.000
	Maybank	10,103,090	1.000	1.000	1.000
	OCBC	1,097,894	0.331	0.436	0.760
	Public	2,622,088	0.228	0.968	0.235
	Southern	764,101	0.254	0.621	0.408
	Std. Ch.	93,056	1.000	1.000	1.000
	BIMB	12,130,915	1.000	1.000	1.000
	RHB	4,288,217	0.237	0.828	0.286
	Alliance	723,479	1.000	1.000	1.000

	BMMB	6,561,482	0.194	0.335	0.580
	HSBC	243,985	0.329	0.329	1.000
	MEAN	3,340,224	0.552	0.723	0.770
	Affin	3,509,064	0.720	0.720	1.000
	AmBank	983,126	0.810	0.810	1.000
	EON	1,621,067	1.000	1.000	1.000
	Hong Leong	1,370,676	0.590	0.590	1.000
	Maybank	12,416,465	0.512	0.512	1.000
	OCBC	1,643,753	0.414	0.610	0.679
	Public	3,334,017	0.612	0.612	1.000
2003	Southern	852,280	0.451	0.485	0.930
	Std. Ch.	190,415	0.689	0.689	1.000
	BIMB	13,717,155	1.000	1.000	1.000
	RHB	5,997,330	0.551	0.551	1.000
	Alliance	966,868	0.507	0.726	0.698
	BMMB	7,315,942	0.280	0.475	0.589
	HSBC	1,854,076	0.212	0.421	0.504
	MEAN	3,983,731	0.596	0.657	0.886
	Affin	3,250,297	0.914	0.914	1.000
	AmBank	1,329,375	1.000	1.000	1.000
	EON	3,935,118	0.941	0.941	1.000
	Hong Leong	1,396,770	0.696	0.704	0.989
	Maybank	17,056,547	0.365	0.365	1.000
	OCBC	1,576,225	0.522	0.522	1.000
	Public	8,208,597	0.533	0.765	0.697
2004	Southern	1,048,782	0.622	0.639	0.973
	Std. Ch.	1,080,410	1.000	1.000	1.000
	BIMB	12,958,514	1.000	1.000	1.000
	RHB	6,213,078	1.000	1.000	1.000
	Alliance	1,231,948	0.765	0.814	0.939
	BMMB	8,061,414	0.250	0.426	0.586
	HSBC	3,209,061	0.757	0.817	0.927
	MEAN	5,039,724	0.740	0.779	0.936

Appendix 7: Correlation between the explanatory variables and bank inputs and outputs

Correlations

		log_size	mp	roa	fc	npl	llp	log_csr	logEarnAst	logCurAst	logOtherInc	logTotDep	logNetFa	logPersonnel	priceof Priceof Funds	price_of Price of Ph Cp	priceofl PriceofLab
log_size	Pearson Correlation	1	.700**	-.390**	.023	.158	.270**	.810**	.985**	.809**	.836**	.994**	.226*	.779**	-.157	-.020	.000
	Sig. (2-tailed)		.000	.000	.830	.129	.009	.000	.000	.000	.000	.000	.029	.000	.132	.849	.997
	N	93	93	93	93	93	93	91	93	93	93	93	93	93	93	93	93
mp	Pearson Correlation	.700**	1	-.205*	031	.068	.166	.681**	.681**	.584**	.660**	.702**	.001	.675**	-.002	.078	.302**
	Sig. (2-tailed)	.000		.049	.769	.519	.112	.000	.000	.000	.000	.000	.992	.000	.987	.459	.003
	N	93	93	93	93	93	93	91	93	93	93	93	93	93	93	93	93
roa	Pearson Correlation	-.390**	-.205*	1	-.011	.015	-.108	-.115	-.397**	-.460**	-.216*	-.393**	.122	-.179	.122	.055	.105
	Sig. (2-tailed)	.000	.049		.919	.887	.304	.279	.000	.000	.037	.000	.243	.087	.244	.598	.317
	N	93	93	93	93	93	93	91	93	93	93	93	93	93	93	93	93
fc	Pearson Correlation	.023	.031	-.011	1	.003	-.124	-.012	.002	.057	.079	.084	-.028	.026	-.100	.084	.056
	Sig. (2-tailed)	.830	.769	.919		.974	.236	.912	.986	.587	.454	.424	.787	.803	.340	.421	.594
	N	93	93	93	93	93	93	91	93	93	93	93	93	93	93	93	93
npl	Pearson Correlation	.158	.068	.015	.003	1	.571**	.084	.158	.164	.135	.174	-.344**	.107	.233*	.298**	.034
	Sig. (2-tailed)	.129	.519	.887	.974		.000	.428	.129	.117	.196	.096	.001	.308	.024	.004	.746
	N	93	93	93	93	93	93	91	93	93	93	93	93	93	93	93	93
llp	Pearson Correlation	.270**	.166	-.108	-.124	.571**	1	.205	.298**	.149	.257*	.268**	-.392**	.248*	.262*	.353**	.080
	Sig. (2-tailed)	.009	.112	.304	.236	.000		.051	.004	.155	.013	.009	.000	.016	.011	.001	.445
	N	93	93	93	93	93	93	91	93	93	93	93	93	93	93	93	93
log_csr	Pearson Correlation	.810**	.681**	-.115	-.012	.084	.205	1	.814**	.590**	.722**	.804**	.271**	.687**	-.108	.033	.066
	Sig. (2-tailed)	.000	.000	.279	.912	.428	.051		.000	.000	.000	.000	.009	.000	.308	.756	.534
	N	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91
logEarnAst	Pearson Correlation	.985**	.681**	-.397**	.002	.158	.298**	.814**	1	.732**	.845**	.978**	.210*	.775**	-.114	-.023	.011
	Sig. (2-tailed)	.000	.000	.000	.986	.129	.004	.000		.000	.000	.000	.044	.000	.276	.826	.919
	N	93	93	93	93	93	93	91	93	93	93	93	93	93	93	93	93
logCurAst	Pearson Correlation	.809**	.584**	-.460**	.057	.164	.149	.590**	.732**	1	.578**	.807**	.138	.639**	-.362**	.040	.017
	Sig. (2-tailed)	.000	.000	.000	.587	.117	.155	.000	.000		.000	.000	.186	.000	.000	.702	.869
	N	93	93	93	93	93	93	91	93	93	93	93	93	93	93	93	93
logOtherInc	Pearson Correlation	.836**	.660**	-.216*	.079	.135	.257*	.722**	.845**	.578**	1	.828**	.129	.762**	-.063	.112	.236*
	Sig. (2-tailed)	.000	.000	.037	.454	.196	.013	.000	.000	.000		.000	.217	.000	.552	.287	.023
	N	93	93	93	93	93	93	91	93	93	93	93	93	93	93	93	93
logTotDep	Pearson Correlation	.994**	.702**	-.393**	.084	.174	.268**	.804**	.978**	.807**	.828**	1	.207*	.781**	-.164	-.011	.016
	Sig. (2-tailed)	.000	.000	.000	.424	.096	.009	.000	.000	.000	.000		.046	.000	.115	.917	.878
	N	93	93	93	93	93	93	91	93	93	93	93	93	93	93	93	93
logNetFa	Pearson Correlation	.226*	.001	.122	-.028	-.344**	-.392**	.271**	.210*	.138	.129	.207*	1	-.093	-.223*	-.721**	-.488**
	Sig. (2-tailed)	.029	.992	.243	.787	.001	.000	.009	.044	.186	.217	.046		.373	.032	.000	.000
	N	93	93	93	93	93	93	91	93	93	93	93	93	93	93	93	93
logPersonnel	Pearson Correlation	.779**	.675**	-.179	.026	.107	.248*	.687**	.775**	.639**	.762**	.781**	-.093	1	-.189	.221*	.555**
	Sig. (2-tailed)	.000	.000	.087	.803	.306	.016	.000	.000	.000	.000	.000	.373		.070	.034	.000
	N	93	93	93	93	93	93	91	93	93	93	93	93	93	93	93	93
priceof Priceof Funds	Pearson Correlation	-.157	-.002	.122	-.100	.233*	.262*	-.108	-.114	-.362**	-.063	-.164	-.223*	-.189	1	.037	.040
	Sig. (2-tailed)	.132	.987	.244	.340	.024	.011	.308	.276	.000	.552	.115	.032	.070		.726	.707
	N	93	93	93	93	93	93	91	93	93	93	93	93	93	93	93	93
price_of Price of Ph Cp	Pearson Correlation	-.020	.078	.055	.084	.298**	.353**	.033	-.023	.040	.112	-.011	-.721**	.221*	.037	1	.394**
	Sig. (2-tailed)	.849	.459	.598	.421	.004	.001	.756	.826	.702	.287	.917	.000	.034	.726		.000
	N	93	93	93	93	93	93	91	93	93	93	93	93	93	93	93	93
priceofl PriceofLab	Pearson Correlation	.000	.302**	.105	.056	.034	.080	.066	.011	.017	.236*	.016	-.488**	.555**	.040	.394**	1
	Sig. (2-tailed)	.997	.003	.317	.594	.746	.445	.534	.919	.869	.023	.878	.000	.000	.707	.000	
	N	93	93	93	93	93	93	91	93	93	93	93	93	93	93	93	93

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).